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Commentary

FOOD PREFERENCES AND CHEMICAL SENSES: Comments on the Food Attitude Survey of Frank and van der Klaauw

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Frank and van der Klaauw (1994) have developed a new Food Attitude Survey (FAS) and have presented evidence that differences in chemosensory responses may be related to food attitudes. This study represents an important attempt to link together chemical senses and food attitudes. Although there is a widespread assumption that the two are linked, there are very few data to support that assumption. In a series of papers based on analysis of food preference data, Meiselman (1977, 1987) tried to link perception of sweetness and the preference for sweet foods. In a recent review, Meiselman (1992) challenged the assumed dependence of food habits and sensory factors.

Frank and van der Klaauw obtained food preference data on 455 foods from 719 introductory psychology students. From these students they selected 10 food likers, 10 food dislikers, and 10 students who won't try foods. These 30 students then underwent sensory tests, including PTC and quinine thresholds, taste and olfactory intensity and hedonic tests. Although there were a number of minor effects, there were generally no major differences among the three food attitude groups for quinine or PTC thresholds, taste intensity or hedonics. For smell intensity and hedonics, the food dislikers and the won't tryers gave lower ratings than the likers. In other words, food likers might experience odor as more intense and more pleasant, a finding which was replicated in follow-up studies.

Is the Food Attitude Survey developed by Frank and van der Klaauw suitable for further use, as the authors state? And are the chemosensory effects based on food attitudes credible in view of the methodology used?

The Food Attitude Survey utilizes a five-category scale, as follows (Frank & van der Klaauw, 1994):

1. I really like this food. I think it tastes good.
2. I can take or leave this food. It tastes O.K.
3. I dislike this food. It tastes awful.
4. I've never tried this food, but would taste it if I had the opportunity.
4. I've never tried this food and never intend to try it.

The authors state that "The FAS was modeled after the U.S. Army Natick Laboratory's Food Preference Survey (Peryam & Pilgrim, 1957)". The reference to Peryam and Pilgrim is to one of the classical references for the nine-point hedonic scale, which was developed earlier by the U.S. Army and which was utilized in a series of food preference surveys which were summarized by Meiselman (1988). The more recent food preference surveys conducted by Natick also used a preferred frequency scale. Neither the original hedonic scale nor the Natick surveys used a category scale similar to the one used by Frank and van der Klaauw.

The nine-point hedonic scale uses a graded set of categories of dislike and liking, extending from "extremely dislike" to "extremely like". It is balanced about its neutral midpoint with

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the same modifiers used for degrees of like and for degrees of dislike. The modifiers were selected to represent different and ordered degrees of like/dislike. The neutral point is defined as "neither like nor dislike". The hedonic scale is usually represented by the mean value of a relatively large number of respondents. In contrast, the Food Attitude Scale of Frank and van der Klaauw represents five distinct categories without any continuous dimension such as like/dislike. The FAS is represented by the frequency of response for each of the five response categories; that is, each subject generates five measures. Thus, in contrast to the hedonic scale, it is not possible to examine degrees of like or dislike with the FAS.

Frank and van der Klaauw determined the "pleasantness" of their foods using "a selected group of 'average' subjects ($N=14$)" (p. 106). Pleasantness or unpleasantness was determined by the majority opinion of the 14 students. These results were compared to those of the Natick questionnaire, although the authors do not state how or to what data they were compared. Hedonic data from such a small subsample are highly suspect.

In the development of the FAS, the authors have added flavor words to the hedonics of like and dislike ("tastes good", "tastes O.K.", "tastes awful"). Similarly, the "would try" statement contains a taste reference. This raises the question of what the respondent is selecting: an hedonic judgment, a sensory judgment, or both. The authors have set out to look for a relationship between food attitudes and chemical senses, but such a relationship has been built into the Food Attitude Scale.

Other methodological issues can be raised about the Food Attitude Scale. Are the like and dislike statements equally strong? I would judge that the statement "it tastes good" should be balanced by "it tastes bad", rather than by the much stronger "it tastes awful". Further, is the neutral category (No. 2. I can take or leave this food. It tastes O.K.) perceived as neutral by the reader? If it "tastes O.K.", is it slightly positive? In addition, the Natick survey permitted the respondent to select "never tried" instead of making an hedonic judgment. Thus, the Natick survey covered the options of like, neutral, dislike, and never tried. The FAS has combined hedonic, sensory, and behavioral elements into one scale.

In view of all these differences between the Food Attitude Scale and the Natick Food Preference Survey, it is unclear why the authors state that the former was modeled after the latter. For those familiar with the nine-point hedonic scale or with the Natick Food Preference Survey, caution is in order when assuming any similarity with the FAS.

The three fictitious foods used in the FAS were developed by Natick (Meiselman *et al.*, 1972) and first reported by Meiselman and Waterman (1978), who noted that 80–84% of respondents indicated they had never tried them. The remaining 16–20% did rate the items, suggesting either misinformation or response bias. Frank and van der Klaauw used a 105-subject subsample to analyse the fictitious foods and found that 7% gave a hedonic or neutral response rather than "never tried". The large difference between the Natick results and the FAS results could result from the different populations and/or from the different survey methods.

In order to relate the FAS results to chemosensory differences, Frank and van der Klaauw recruited subsamples of 10 likers, 10 dislikers, and 10 won't tryers from individuals whose numbers of likes, dislikes, or won't trys fell above the 85th percentile. These subsamples represent extreme degrees of like, dislike and won't try and were more likely to show differences. The higher olfactory hedonic and intensity ratings of likers might be due to a positive bias, not only for odors, as the authors volunteer, but for all stimuli. The likers were also more willing to try fictitious foods. Frank and van der Klaauw in fact suggest that their food likers might be general sensation seekers. If that is the case, I believe it would require reassessment of what "like" is based on in the FAS. Conversely, they describe their dislikers and won't tryers as food neophobics. They further suggest that these neophobic tendencies could have contributed to the chemosensory differences observed. Thus, the use of 85th percentile subgroups might have accentuated any differences and pushed the study from a study of average eaters to a study of more extreme eaters.

Frank and van der Klaauw end their paper with a call for more research, including a longitudinal study of people undergoing changes in their food environments. Just such a study

is now underway at Bournemouth University (Meiselman *et al.*, 1994, 1995). They also call for additional studies on sensory factors. Whether the FAS is a useful instrument for such studies is yet to be confirmed. Further research will need larger sample sizes and perhaps different approaches to selecting subsamples such as "likers". Research might indicate the need for a scaling approach different from the FAS's category scale.

Despite these hesitations, Frank and van der Klaauw have reopened an important issue in food selection: in what ways are food habits related to the senses. Further, they have provided methods for such research which others can adopt, change, or challenge.

References

Frank, R. A. & van der Klaauw, N. J. (1994). The contribution of chemosensory factors to individual differences in reported food preferences. *Appetite, 22*, 101–23.

Meiselman, H. L. (1977). The role of sweetness in the food preference of young adults. In J. M. Weiffenbach, (Ed.), *Taste and development: The genesis of sweet preference.* Pp. 269–81. Maryland: National Institutes of Health, DHEW Publication No. 77–1068.

Meiselman, H. L. (1987). Sweetness in food service systems. In J. Dobbing (Ed.), *Sweetness.* Pp. 261–74. London: Springer.

Meiselman, H. L. (1988). Consumer studies of food habits. In J. R. Piggott (Ed.). *Sensory analysis of foods, 2nd Edition.* Pp. 267–334. Barking, England: Applied Science Publishers.

Meiselman, H. L. (1992). Methodology and theory in human eating research. *Appetite, 19*, 49–55.

Meiselman, H. L. & Waterman, D. (1978). Food preferences of enlisted personnel in the Armed Forces. *Journal of the American Dietetic Association, 73*, 621–9.

Meiselman, H. L., Van Horne, W., Hasenzahl, B. & Wehrly, T. (1972). The 1971 Fort Lewis Food Preference Survey. United States Army Natick Laboratories Technical Report 72-43-PR, 123 pp.

Meiselman, H. L., Mastroianni, G. & Edwards, J. (1994). A longitudinal study of food habits, attitudes and human performance. *Appetite, 24*, (abstract), 193.

Meiselman, H. L., Mastroianni, G., MacDonald, H., Buller, M. E. & Edwards, J. S. A. (1995). Stability of food attitudes in students entering university. *Appetite*, in press.

Peryam, D. R. & Pilgrim, F. J. (1957). Hedonic scale of measuring food preferences. *Food Technology, 11*, 9–14.